CALIFORNIA EDUCATION

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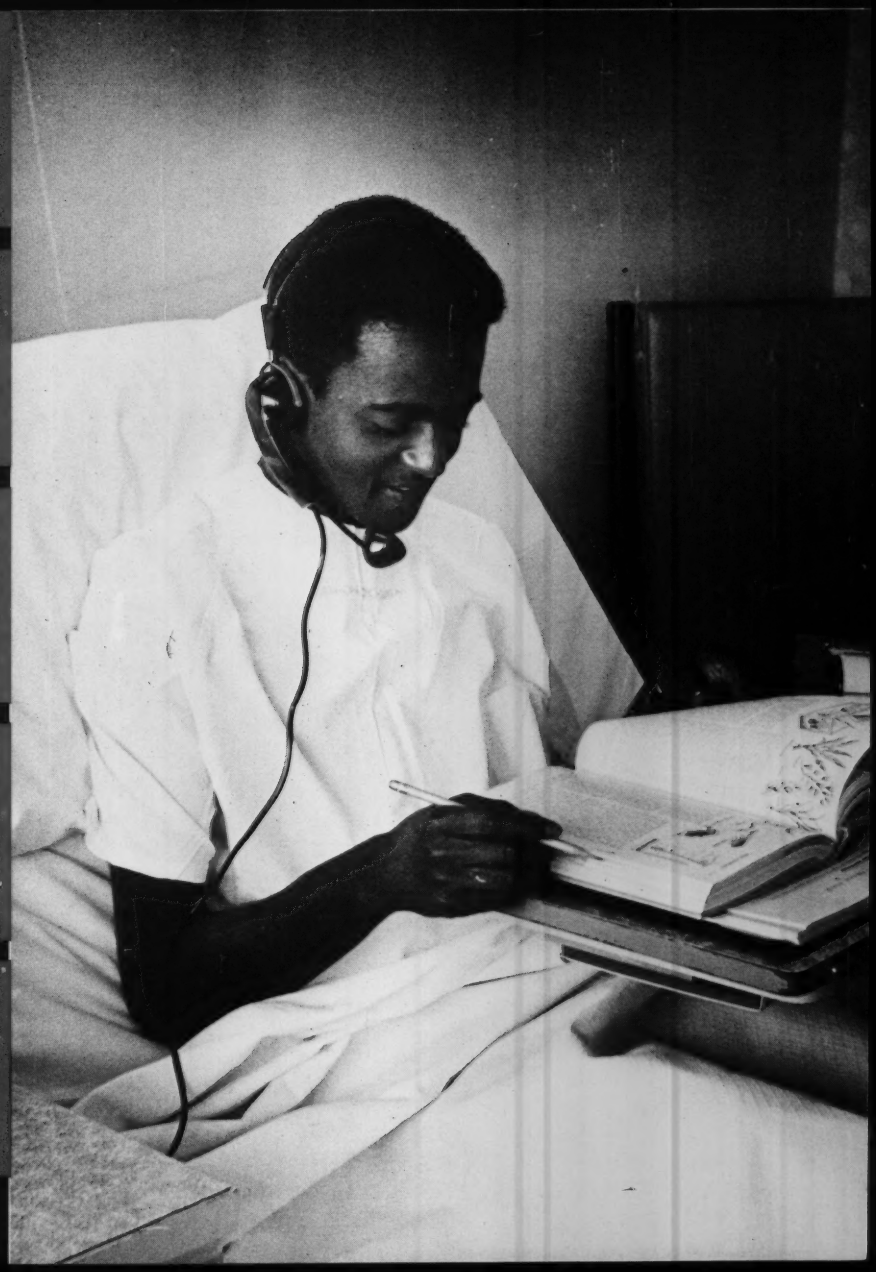

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MAX RAFFERTY
Superintendent of Public Instruction

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THE COVER PHOTO—While he is a patient in the Orthopaedic Hospital in Los Angeles, this student keeps up with his schoolwork through tele-class instruction. Los Angeles Unified School District's program for teaching hospitalized and homebound students by telephone is described in an article beginning on page 3.

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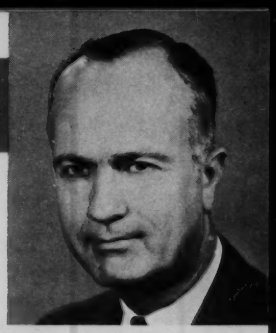
FROM THE SUPERINTENDENT

EDUCATION IN DEPTH

BARNEY FITZPATRICK
SECTION EDITOR



MAX RAFFERTY

EDUCATIONAL CHANGES IN 1965 . . .

Once again, it is time to assess our progress toward achieving *Education in Depth*. There have been some heartening achievements in California education in 1965, and a review of them leads us to the conclusion that we *are* making rapid progress toward our goal. The following represent some of the developments that will help California produce men, as the poet Josiah Holland said, who have "strong minds, great hearts, true faith, and ready hands"—men who can meet the demands of the time:

- *History and Geography in Primary Grades.* For the first time, a call was issued for bids for supplementary textbooks in the specific subjects of history, geography, and related social sciences for use in grades two and three.
- *Foreign Language in Elementary Schools.* California became the first state in the nation to make foreign language instruction mandatory in the elementary grades. For the 1965–66 school year, over 90 percent of the school districts maintaining elementary schools were able to comply with the law. Exemptions were granted if providing instruction in a foreign language imposed an unreasonable burden on the district.
- *Reading Programs at Primary Level.* California moved ahead of the rest of the nation in instituting its own special reading program for pupils in the primary grades. Under the Miller-Unruh Basic Reading Act, special reading programs have been established for the purpose of correcting and preventing reading problems at the earliest possible time in a pupil's educational career.
- *Preschool Educational Programs.* It cannot be denied that if young people were introduced to an atmosphere of learning before they enter school, their performance, motivation, and productivity would be better than if they were not so favored. Therefore, the passage of Speaker Jesse Unruh's Assembly Bill 1331 gives children of low income or disadvantaged families in California an opportunity to obtain this advantage. Summarized briefly, AB 1331 authorizes the establishment of public nonprofit preschool education programs.
- *Mathematics Textbooks.* The new mathematics textbooks placed in the schools in 1965 presented an approach of far greater depth than did the books of the past. Although the new books do not eliminate the necessity for memorizing the multiplication tables, tables of weights and measurements, and so forth, students using the new textbooks will be better able to see the close relationships between the operations of multiplication and division, and addition and subtraction. In these textbooks, more attention is paid to mathematical logic, and consequently definitions and mathematical ideas are presented more clearly.
- *Role of Ethnic Minorities.* The new textbooks in history and geography, which were placed in the fourth grade of California's public schools last fall, give more attention to the role of ethnic minorities in California than did their predecessors.
- *California Constitution.* Through the efforts of the Department, the original California Constitution of 1849 and its Spanish version have been reproduced for use as teacher aids in history and foreign language instruction.
- *Instruction in Economics.* The economic illiteracy of California's high school students is on the way out. Enrollment in eco-

nomics courses in 1965 was 161 percent greater than it was in 1961.

- *Single Test.* As a result of the passage of Senate Bill 1146 (Sedgwick), which received the Superintendent's full support, a single test will be used in each area examined under the state testing program. Thus, with the data from one test rather than several, we will be in a better position to evaluate the comparative educational progress of our students.

- *Junior Colleges.* Passage of the Junior College Construction Act in the 1965 regular session of the Legislature establishes a milestone for the junior colleges. For the first time, they will have state support in a continuing program of facilities construction.

- *Adult Basic Education.* A new California plan, which was prepared by the Department of Education, was adopted in 1965. It was designed to give special help to those adults whose lack of basic education skills prevents them from becoming productive members of society.

- *Merit Pay Resolution.* The Superintendent of Public Instruction has always believed that teachers who have demonstrated outstanding competence and success in the instruction of their pupils should be paid a salary based on more than longevity and educational attainments. Therefore, in June he was pleased to be able to inform superintendents of school districts that both houses of the Legislature had passed a resolution (Assembly Concurrent Resolution No. 69) urging the adoption of salary schedules for certificated employees ". . . to provide for the payment of higher than standard salaries for classroom teachers who have demonstrated outstanding competence and success in the instruction of their pupils. . . ." Assemblyman Charles B. Garrigus was largely responsible for the passage of this measure, which the Superintendent helped to initiate.

- *Credentials.* Between December, 1964, and December, 1965, the Department of Education reduced the time lag in handling credential matters by 74 days, a 65 percent reduction in time.

The Department is also establishing two regional offices, one in Hayward and one in Los Angeles, to handle credential matters—another development to provide better and faster service for applicants.

- *Intergroup Relations.* More and more school districts learned to use the services of the Commission on Equal Opportunities in Education and the Department's Bureau of Intergroup Relations. In doing so, the districts helped California maintain its enviable record of avoiding major boycotts and picketing in protest of *de facto* segregation in the schools.

- *Compensatory Education.* Greater efforts were made in 1965 toward solving the problems of educating the culturally disadvantaged in California than at any other time in the history of the state.

- *Department Survey.* The second phase of the survey of the Department of Education, the first in 20 years, was ordered to begin. Phase one was completed in 1964 by Arthur D. Little, Inc.

  Top priority for phase two of the study has been given to junior college matters.

- *School District Organization.* By September, 1965, 61.9 percent of the state's average daily attendance in kindergarten and grades one through twelve was in unified school districts or in districts in which unification elections have been successful. We cannot, however, expect unifications to be accomplished as speedily in the future.

- *Cooperation with Mexico.* The cooperation between Mexican and California educators was strengthened by Superintendent Rafferty's meeting with Mexican officials in Baja California, where a tour of educational facilities was arranged for him.

- *State and Local Cooperation.* The resourcefulness and cooperation of educators were tested by the floods that hit the schools in Del Norte, Humboldt, and Siskiyou counties in the winter of 1964–65. Let the record show that educators at the state and local levels solved the problems and put the schools back in operation immediately.

EDWARD B. STARK
SECTION EDITOR

Tele-Classes in Los Angeles Schools

B. Kathleen C. Curnow
Specialist, Home, Hospital, and Tele-Class Programs
Los Angeles Unified School District

School districts throughout California are continuously seeking better ways to educate pupils who are physically unable to attend school. In the past, the Los Angeles Unified School District has depended primarily upon three ways to teach homebound and hospitalized pupils:

Kathleen C. Curnow

- Homebound pupils have received individual instruction from a visiting teacher for at least one hour a week.
- Hospitalized pupils have received individual or group instruction.
- Executone equipment has used to provide two-way communication between the home or hospital and the regular classroom.

All three methods have made worthwhile contributions to the pupils' education and to their improved mental health and physical recovery. Yet, these programs cannot always provide a sense of group participation and the stimulus to learning gained from peer interaction. Consequently, the school district, in cooperation with the Pacific Telephone Company, devised "tele-classes" to use the telephone to bring the classroom to the pupils and to provide improved instruction at a lower cost to the school district.

In tele-classes, pupils and teachers are joined by telephone, which enables the pupils to hear the teacher and their homebound classmates. They are able to recite and join in discussions. Instruction is provided as in the classroom, sometimes individually but more often in groups, with the teacher controlling the mechanics as he teaches.

In the fall semester of 1962, an experimental tele-class began with one teacher and five high school pupils. No longer considered experimental, tele-classes during the 1964–65 school year enrolled 338 pupils, taught by 14 tele-class teachers, six at the high school level and eight at the elementary level. Pupil enrollment averaged 14 weeks, with 19 pupils enrolled for the entire school year. The pupils suffered from a wide spectrum of physical disability, with 92 distinct impairments noted.

Advantages of Tele-Classes

What purposes do tele-classes serve? This question might be answered in different ways by different individuals. A budget-harassed superintendent might answer that tele-classes provide an economical and effective method of teaching homebound pupils. Parents of homebound pupils might answer that tele-classes bring more educational and enriching experiences into their children's lives. The regular teacher, to whom a tele-class pupil returns, might answer that tele-classes make it possible for the homebound pupil to keep up with the regular classwork. The pupil might answer that this is a way to keep in touch with other boys and girls of his age and school grade while doing his regular assignments. He might also say that tele-classes make it possible to be away from school for as long as an entire year and yet continue with his classmates into the next grade without having to make up academic work. The answer given in each instance would be correct.

Homebound and hospitalized pupils must have the opportunity to develop academically to the degree that their health permits. They need to grow in independence. They need to continue to develop attitudes and skills which will promote acceptance and easy articulation when they return to their regular classes. They need to maintain school contacts with other children. Tele-classes provide full-time, daily academic instruction in basic subjects as prescribed in the regular course of study. They offer an opportunity for pupils to work independently as well as to interact with their peers. They afford the opportunity to form friendships with other homebound children.

Homebound pupil recuperating from acute osteomyelitis can participate in daily group instruction via tele-classes.

They make possible the development of a more wholesome philosophy in regard to physical disability.

Tele-classes provide a school program particularly valuable for pupils suffering from severe *osteogenesis imperfecta* ("soft" bones) with multiple fractures; residual handicaps from bulbar polio, requiring an iron lung; paralysis resulting from catastrophic accidents such as neck fractures; and terminal diseases such as malignancies, leukemia, and muscular dystrophy. Any of these conditions limits pupils so that they are unable to endure a regular program; yet, they have the alertness and strength to pursue a limited education. For these pupils and their families, there is an urgent need to maintain normalcy in daily living. Tele-classes have served in a number of such cases to keep pupils busy and interested as long as their health permits. For parents as well as for pupils, this program has been a blessing indeed.

Pupils Served by Tele-Classes

Tele-classes are provided for pupils who meet the following criteria:

- Are in grades four through twelve
- Will be physically unable to attend school for at least two months; or one month, if hospitalized
- Are confined at home under the orders of a qualified physician who approves their participation in an instructional program
- Have sufficient ability to profit from tele-class instruction
- Have had satisfactory marks in work habits and in cooperation in their regular school experiences
- Have a suitable learning environment at home during the school day
- Have a residence telephone already operating in the home (because of the Public Utilities Commission's ruling that a residence telephone must be operative for both incoming and outgoing calls)

Only 40 percent of all pupils for whom home instruction has been requested during the past two years have been able to meet these criteria and enroll in a tele-class.

Administration of Program

Tele-class centers in the Los Angeles city schools are located in the special schools for the physically handicapped and are administered by the principals of the schools. Textbooks, materials, and supervision of curriculum and instruction are the responsibility of the school principal.

Tele-class teachers must hold a valid credential to teach physically handicapped children. Their personal qualifications should include versatility, imagination, initiative, skill in interpersonal relations, ability to plan and organize materials, and pleasant, expressive speech. It is essential that the tele-class teacher be able to adapt his instruction to the visual limitations posed by such teaching. Pacific Telephone Company personnel teach teachers how to operate the equipment.

Telephone service from the center to the pupil's home is handled by individual business-rate lines. The pupil has an individual line, and his equipment is charged at regular residence rates. All charges, installation costs, monthly rentals, and message units or "foreign exchange" lines used when pupils live outside a local message unit zone, are billed to the school district. No charge of any kind is made to the pupil or his family.

Tele-class operating costs average $25 per pupil per month. This figure includes the rental fees paid for equipment used at the center and in the pupil's home. The cost of the initial installation of equipment at the center is capital expenditure and is not included in the monthly cost.

Tele-classes are reimbursable for excess cost as special day classes for physically handicapped minors at $910 per unit of average daily attendance. To qualify for reimbursement, a minimum school day of 240 minutes is required, although pupils need not remain in direct telephone communication for the entire time. Part of each day, as in a classroom, is allocated to study, drill, and other activities.

The school district has set the class size at 13–15 pupils. Interdistrict transfers of homebound pupils residing in nearby areas may be arranged and their home school districts billed for educational costs.

Equipment for Program

The mechanical equipment is installed and maintained by the telephone company serving the area. Although the Pacific Telephone Company has devised and installed the tele-class consoles in the Los Angeles centers, three telephone companies are involved in providing equipment for pupils.

The pupil's equipment consists of a headset plugged into a telephone base which receives only incoming calls. This equipment operates independently of any telephone in the home.

The school's tele-class center consists of a room of about 125 square feet, containing shelves and files for books and materials, a cabinet for electronic equipment, the teacher's chair and desk, and on the desk, a two-piece console used by the teacher to make telephone connections with his pupils. A speaker-phone on the desk transmits his voice and receives the voices of pupils.

The Instructional Program

Before a pupil is enrolled in a tele-class, his parents receive a form letter explaining the program, the installation of equipment, and the necessary responsibilities of parent and child. Included also are suggestions for effective telephone use.

Then the tele-class teacher visits the home to meet the pupil and his family and to work out any adjustments necessary to meet therapy schedules, rest periods, hospital or doctor visits, and the like. On this visit the teacher brings the needed textbooks.

Whenever possible, the program of the pupil in his regular school is offered at home. At the elementary school level, the teacher covers the basic academic subjects and may also include music and art appreciation, art, or crafts. At the high school level, the basic academic subjects are offered with electives in music appreciation, clothing, typing, and driver education.

In the program's experimental stages, it was often necessary for the tele-class teacher to teach a wider span of grades and subjects than desirable. Now teachers work with a grade span of no more than two years at the elementary level. From grades nine though twelve, the teaching is departmentalized.

Supplemental books, worksheets, maps, charts, special illustrations and publications, and assignments are sent by school mail from

The components on this teacher's desk comprise the console unit for tele-teaching. The buttons on the teacher's office telephone connect with each pupil, and the lights beside the buttons glow when the lines are in use. Behind the teacher's intake speaker is the automatic card dialing unit, holding the cards of five students working as a group. At right is the teacher's microphone.

the center to the regular elementary school nearest the pupil's home. A designated person (parent, brother or sister, or classmate) delivers them from the school to the tele-class pupil. The pupil employs the same procedure in reverse to send his finished homework to the tele-class teacher. Homebound pupils have been found to be unusually thorough and prompt in completing their assignments.

The tele-class teacher visits each pupil as necessary, to maintain personal contact with the pupil and his family and to give tests.

Use of the Equipment

The teacher's telephone call opens the pupil's line, connecting him with the center and his classmates. A set of buttons (one for each pupil) on the console enables the teacher to talk privately with one pupil or to divide the class into separate discussion groups. The console is also equipped with an automatic dialer, which uses prepunched plastic cards for rapid, accurate dialing. The pupil's name is written on the top of each plastic dialing card, and after dialing, the teacher places the card in the slot on the console beside the pupil's line connection. A button beside each line glows when the pupil speaks. This affords visual identification of voices, and helps the teacher to watch the interaction in group discussions to which he may not be listening at the moment.

The tele-class teacher dials a group of pupils, discusses material with them, and gives them an assignment. The pupils are connected on a conference network so all can participate. The teacher may then disconnect this first group entirely and call in another group. Or he may leave the group connected for pupil-led discussion, practice, or review and may free only his own line to call in another pupil or group of pupils. Or the first group of pupils may be connected with a taped lesson or perhaps a resource teacher in another room.

After a group has been working independently for a prearranged period of time, the teacher calls the pupils again and checks their work. Each group is instructed by the teacher at least once every hour.

Some Recent Developments

During the spring semester of 1965, tele-class equipment was installed at four bedsides in the Orthopaedic Hospital in Los Angeles for high school students. This experiment in tele-class instruction was favorably received by hospital personnel and by the pupils. This program may be expanded to include other hospitals serving long-term school-age patients for whom no hospital classroom facilities are available. Since hospital stays are growing shorter, the problem has been to find pupils whose anticipated hospitalization will be at least one month. It is economical to serve pupils for periods of at least one month in a hospital. Tele-class equipment is installed in the hospital rooms once a year and pupils are brought to those rooms. This allows many pupils to use the equipment.

As another experiment, two tele-class teachers offered high school art lessons, which included design, collage, figure-drawing, clay modeling, advertising art, and art appreciation. These lessons proved to be so successful and held such value in career exploration by students that future plans include lessons in water color, textile design, the color spectrum, industrial design, and stage design. Local educational television programs were coordinated with the tele-class lessons to provide additional motivation and sequential learning.

During the fall semester of 1965, the school district began an experimental program to instruct slow-learning orthopedically handicapped pupils. The results of this program are encouraging. A homogeneous grouping of pupils is maintained, based on achievement test stanine scores in the second, third, and fourth stanines; aptitude scores between low-average and educable mentally retarded; and satisfactory marks in effort and citizenship.

In conjunction with this program, tele-conferences are being planned to help parents understand and adjust to the particular disabilities and needs of their homebound children.

Some of the Problems

There is a need to reduce further the range of grade levels and subjects taught by any one tele-class teacher. Use of resource teachers in such subject fields as foreign language and science may help to resolve this problem. Teaching small groups of pupils from several centers simultaneously is possible with the new equipment.

Even a full body cast does not prevent this student from carrying nearly the same academic program as that of his friends who are able to go to school.

Getting substitute teachers trained in tele-class teaching has also proved to be a problem. Some schools have solved this problem by training one of their regular teachers to handle the tele-class in the absence of the tele-class teacher, while a substitute teacher is assigned to do the work of the teacher. Another solution has been to develop a small "pool" of trained teachers within the regular substitute teaching group. The difficulty in this plan lies in the turnover of substitute personnel, which necessitates continuous training of new people. This year the Pacific Telephone Company made available personnel from its traffic department to be on call to instruct substitute teachers in operating the equipment.

Testing in tele-classes is difficult. Since written tests usually require the tele-class teacher to visit the home, oral examinations often are used. Oral testing is facilitated by the console equipment, which allows the teacher to hear pupils either singly or in a group without their hearing one another.

The most difficult subjects to teach in tele-classes continue to be science and mathematics. Special workshops are being planned in which tele-class teachers and curriculum consultants can work together to develop materials adapted to tele-class teaching.

Short-term tele-class instruction is too expensive because of the installation charge for the pupil's equipment. Careful selection is necessary to avoid enrollment of pupils who will be homebound for less than two months.

Moving and reinstalling tele-class equipment is quite costly and results in the interruption of teaching. Therefore, families are urged to remain in their original residence until the school year ends or until the pupil is able to return to school. Occasionally, parents will request that equipment be moved from one room to another. This also involves an expenditure by the school district that is avoided unless the move is necessary. Parents are advised, when contacted in regard to placement of their child in the program, to be sure to select the most suitable location for the tele-class equipment. A quiet place away from family distractions and convenient for handling books and papers is recommended.

It has become necessary to centralize pupil placement procedures in order to balance class loads and to make certain that each pupil is assigned to the appropriate center, based on the message unit schedule of the telephone companies involved. Centralized placement also assures screening to avoid enrollment of a pupil whose home environment causes problems for other pupils listening and to select pupils best able to profit from this type of instruction.

Finally, tele-classes are not recommended for pupils below the fourth grade. Young pupils need to have their teacher present because they require a more concrete approach to learning than tele-class instruction permits.

Despite the inevitable problems, the pupils, parents, teachers in regular schools, tele-class teachers, and the members of the Los Angeles Board of Education are unanimous in their approval of this program as a valuable advancement in the education of boys and girls who are physically unable to attend school.

RUTH OVERFIELD
SECTION EDITOR

New Textbooks for the *New* Mathematics

By Richard P. Feynman
Richard Chace Tolman Professor of Physics
California Institute of Technology
Former Member of the California State Curriculum Commission

As a member of the California State Curriculum Commission in 1964, I spent considerable time on the selection of mathematical textbooks for use in a modified arithmetic course for grades one through eight in California's elementary schools.

I have carefully read all of the books submitted by their publishers for possible adoption in California (18 feet of shelf space, 500 pounds of books!). Here I should like to describe and criticize these books in a general way, particularly with regard to the mathematical content—what it is we are trying to teach. I shall omit important matters, such as whether the books are written so that it is easy for the teacher to teach well from them, or the student to read them. Many of the books finally selected by the state for adoption do still contain some of the faults described in this article. This is because one could only select from what was submitted by the publishers, and few really good books were submitted. Also, budget limitations prevented adoption of most of the supplementary books that the Commission recommended in order to try to compensate for the faults of those basic books that were selected.

Why do we wish to modify the teaching of mathematics in the schools? It is only if we see this clearly that we can judge whether or not the new books satisfy the need. Most people—grocery clerks, for example—use a great deal of simple arithmetic in their daily life. In addition, there are those who use mathematics of a higher form—engineers and scientists, statisticians, all types of economists, and business organizations with complex inventory systems and tax problems. Then there are those who go directly into applied mathematics. And finally, there are the relatively few pure mathematicians.

When we plan for early training, then, we must pay attention not only to the everyday needs of almost everyone, but also to this large and rapidly expanding class of users of more advanced mathematics. It must be the kind of training that encourages the type of thinking that such people will later find most useful.

Many of the books go into considerable detail on subjects that are only of interest to pure mathematicians. Furthermore, the attitude toward many subjects is that of a pure mathematician. But we must not plan only to prepare pure mathematicians. In the first place, there are very few pure mathematicians and, in the second place, pure mathematicians have a point of view about the subject which is quite different from that of the users of mathematics. A pure mathematician is very impractical; he is not interested—in fact, he is purposely *dis*interested—in the meaning of the mathematical symbols and letters and ideas; he is only interested in logical interconnection of the axioms, while the user of mathematics has to understand the connection of mathematics to the real world. Therefore, we must pay more attention to the connection between mathematics and the things to which they apply than a pure mathematician would be likely to do.

I hear a term called "new mathematics" used a great deal in connection with this program. That it's a new program of mathematics books is, of course, true, but whether it is wise to use "new," in the sense of very modern mathematics, is questionable. Mathematics which is used in engineering and science—in the design, for example, of radar antenna systems, in determining the position and orbits of the satellites, in inventory control, in the design of electrical machinery, in chemical research, and in the most esoteric forms of theoretical phys-

NOTE: Dr. Feynman, one of three Nobel Prize winners in physics for 1965, has granted special permission to the editor to run this article, which first appeared in The California Institute of Technology Quarterly.

ics—is all really old mathematics developed to a large extent before 1920.

A good deal of the mathematics which is used in the most advanced work of theoretical physics, for example, was not developed by mathematicians alone, but to a large extent by theoretical physicists themselves. Likewise, other people who use mathematics develop new ways to use it and new forms of it. The pure mathematicians have in recent years (say, after 1920) turned to a large extent away from such applications and are instead deeply concerned with the basic definitions of number and line and the interconnection of one branch of mathematics and another in a logical fashion. Great advances in this field have been made since 1920 but with relatively little effect on applied or useful mathematics.

What We're After

I would consider our efforts to find new books and to modify the teaching of arithmetic as an attempt to try to make it more interesting and easier for students to learn those attitudes of mind and that spirit of analysis which are required for efficient understanding and use of mathematics in engineering, science, and other fields.

The main change that is required is to remove the rigidity of thought found in the older arithmetic books. We must leave freedom for the mind to wander about in trying to solve problems. It is of no real advantage to introduce new subjects to be taught in the old way. To use mathematics successfully, one must have a certain attitude of mind—must know that there are many ways to look at any problem and at any subject.

You need an answer for a certain problem—the question is how to get it. The successful user of mathematics is pratically an inventor of new ways of obtaining answers in given situations. Even if the ways are well known, it is usually much easier for him to invent his own way—a new way or an old way—than it is to try to find an answer by looking it up. The question he asks himself is not, "What is the right way to do this problem?" It is only necessary that he get the right answer.

This is much like a detective guessing and fitting his answer to the clues of a crime. In terms of the clues, he takes a guess as to the culprit and then sees whether that individual would be likely to fit with the crime. When he finally suggests the right culprit, everything fits with his suggestion.

Any Way That Works

What is the best method to obtain the solution to a problem? The answer is, any way that works. So, what we want in arithemetic textbooks is not to teach a particular way of doing every problem but, rather, to teach what the original problem is and to leave a much greater freedom in obtaining the answer—but, of course, no freedom as to what the right answer should be. That is to say, there may be several ways of adding 17 and 15 (or, rather, of obtaining the solution to the sum of 17 and 15), but there is only one correct answer.

What we have been doing in the past is teaching just one fixed way to do arithmetic problems instead of teaching flexibility of mind—the various possible ways of writing down a problem, the possible ways of thinking about it, and the possible ways of getting at the problem.

This attitude of mind of a user of mathematics is, it turns out, also really the attitude of mind of a truly creative pure mathematician. It does not appear in his final proofs, which are simply demonstrations or complete logical arguments which prove that a certain conclusion is correct. These are the things that he publishes, but they in no way reflect the way that he works in order to obtain a guess as to what it is he is going to prove before he proves it. To do this, he requires the same type of flexible mind that a user of mathematics needs.

In order to find an example of this, since I am not a pure mathematician, I reached up on the shelf and pulled down a book written by a pure mathematician. It happened to be *The Real Number System in an Algebraic Setting* by J. B. Roberts, and right away I found a quotation I could use:

> The scheme in mathematical thinking is to divine and demonstrate. There are no set patterns of procedure. We try this and that. We guess. We try to generalize the result in order to make the proof easier. We try special cases to see if any insight can be gained in this way. Finally—Who knows how?—a proof is obtained.

So you see that mathematical thinking, both in pure mathematics and in applied mathematics, is a free, intuitive business, and we wish to maintain that spirit in the introduction of children to arithmetic from the very earliest time. It is believed that this will not only better train the people who are going to use mathematics, but it may also make the subject more interesting for other people and make it easier for them to learn.

In order to take this discussion of the character of mathematics away from the abstract and to give a definite illustration, I'll choose material from the first and second years of school as an example—simply the problem of adding.

We suppose first that children can learn to count and that after a while they are very adept at counting. And now we wish to teach them addition. May we remark immediately that a child who can count well, say to 50 or 100, can immediately solve a problem such as $17 + 15 = 32$. For example, if there are 17 boys in the class and 15 girls, how many children are there in the class? The problem doesn't have to be given in the form of an abstract addition; it is simply a matter of counting the boys, counting the girls, and counting the class. We have, as a summary of the result: 17 boys + 15 girls = 32 children.

This method could be used to add any pair of whole numbers but, of course, it's a rather slow and cumbersome method for large numbers, or if a very large number of problems come up. Similar methods exist, such as having a set of counters or fingers and counting the things off on them. Another way is to count the numbers in the head. For example, after a while it is possible for a child to be able to add 3 to 6 by thinking to himself: 7, 8, 9. A more practical method is to learn by rote some of the simpler combinations, such as $3 + 6$, so that if they come up often it is not necessary to do the counting.

Counting large numbers—of pennies, for example—can be simplified by counting in groups instead of counting all the pennies. You can make little piles of five and count the piles of five; or better, you can make the piles of five into ten and then count the piles of ten first, and the number left over. Adding numbers could then be done more easily by adding the groups and the leftovers.

Other ways of getting at addition facts (or doing additions, I should say) is to have a line on which the numbers are marked, or a thing like a calendar on which a whole series of numbers are written, one after the other. Then, if you want to add 3 to 19, you start at 19 and count off three more spots along the line and come to 22. Incidentally, if these numbers are written as dots equally spaced along a line—called the number line—this becomes very useful later for an understanding of fractions and also of measurements, for inch-rulers and other things like thermometers are nothing but a number line written along the edge of the ruler. Therefore, putting the numbers on a line is useful not only for learning addition in the first place but also for understanding other types of numbers.

(Another special trick to remember, at a very elementary level, is that it is possible to determine which is the greater of two numbers without actually counting the numbers. If we have two rather large groups of things, it is easy to find out which group is larger by matching the things in pairs and seeing which group has objects left over. This is the way the number of molecules in different gases was first compared, by the way.)

Addition—the Old Way

In older books, addition is handled in a very definite way, without any variety of tricks or techniques. First we learn the simpler sums by drawing pictures of ducks—5 ducks and 3 ducks, swimming, makes 8 ducks, and so forth—which is a perfectly satisfactory method. Then these numbers are memorized, which is again satisfactory. Finally, if the numbers are bigger than 10, a completely different technique is used. It is first explained how to write the numbers that are larger than 10 and then rules are given for the addition of two-column numbers, without carrying at first. Not until the third grade can carrying be done for the first time.

The dissatisfaction with the old textbook is not that any of the methods used to teach addition are unsatisfactory; they are all good. The trouble is, there are so few methods allowed

that only a rigid and formal knowledge of arithmetic can result.

For example, a problem such as 29 + 3 is not a legitimate problem for two years, for it is not given in the first and second grades, and the child is presumably unable to do that problem because, of course, for it you must carry. On the other hand, if you really understood what addition was, you could obtain the result of 29 + 3 not very long after you have learned to count. Very early—in other words, in the first grade—you could do it by simply thinking: 30, 31, 32.

It is true that this method is slow, but if no other method is available, then this is the method which ought to be used. It should be permitted to be used. It should be one of the possible things that a child might do when he has to add by hook or by crook in a difficult problem. As he gets older, he may increase his efficiency at doing the problems by using other methods, but it should be possible at the very earliest age to do addition problems with any reasonable numbers. There is really nothing different about adding 3 to 6 and adding 3 to 29; it is just that the technical, and generally more efficient, way we finally use when we get older is somewhat different.

A Limited Approach

In understanding the meaning of addition of two numbers—the meaning of sum, and how to get at it—there is no difference in the two problems. So the objection to the standard textbook is that only one method is given for making additions—namely, when the numbers are small, memorize them; when the numbers are larger, formally add them in a vertical column, two numbers together, and not carrying until after the second year. This is entirely too limiting for two years of study. If a child will not learn, or is unable to learn the formal rules, it should still be possible for him to obtain the result of some simple problem by counting or making a number line or by other technical methods.

In order to develop the kind of mental attitude which is required later, we should also try to give as wide a mathematical experience as possible. The sum should not appear always in the same form. There is no reason why every sum should be written 17 with a 15 underneath and a line drawn to obtain 32. A problem such as 17 + $\quad$ = 32, to fill in the blank, is a somewhat different variety but exactly the same type of question with numbers. So let the first grade child cook up a way to obtain the answer to this problem. This is exactly the type of problem he will have to solve later if he becomes an engineer. I don't mean he will have to learn how to subtract. What I mean is that he has to deal with a new form of an old type of situation. The problem is to fill in a blank by any method whatsoever. However, when the blank is finally filled in, it must be correct.

We would not usually be interested, in engineering or in physics, in how a man obtained the result that 15 will go into the blank as long as he finally shows that 15 does work by simply adding the 15 and 17 and seeing if it comes out to 32.

(The only time we would be interested to know how he obtained the 15 is if this is the first time that such a problem has ever been done, and no one has ever known a way to do it previously—or if it seems likely that this type of problem will appear again and again in the future because of a new technical development, and that we would like to have a more efficient method. Then it would be worthwhile to discuss the methods of obtaining the 15.)

So this problem, 17 + $\quad$ = 32 is an analogue of the general problem of applied mathematics: to find a way to fill in a blank number by any method whatsoever. It is a problem that could be given very early in the first year, leaving a freedom for the children to try to obtain the solution by any method they want, but not permitting wrong answers. The thing has to be checked out at the end.

Example of Developing Freedom

Here is another example of developing freedom of a somewhat more complex form: Two times an unknown number + 3 is 9; what is the unknown number? This is, of course, algebra, and there are very definite rules for solving such a problem—subtracting 3 from both sides and dividing by 2. But the number of algebraic equations that can be solved by definite rules is very small.

Another way is to try various numbers for the blank until one is found which fits. This

way should be available to children at a very early age. In other words, problems should be put in many different forms. Children should be allowed to guess and to get at the answers in any way that they wish, in terms of those particular facts which they happen to memorize. Of course, it is necessary as time goes on for them to memorize the ordinary addition facts, the ordinary methods of making additions, multiplications, divisions, and so on, in addition to being allowed a freedom about the solution and the form of the various problems that are given to them.

Later, in more advanced work in engineering, when we have more complex algebraic equations, the only available method is, in fact, to try numbers. This is fundamentally a method that is of great power and will only have to be learned later by the student, or the engineer. The old teaching—that for every problem there is a definite fixed method— is only true for the simplest problems. For the more complex problems which actually arise, there is *no* definite method, and one of the best ways to solve complex algebraic equations is by trial and error.

Another exercise which involves a greater degree of freedom is guessing a rule. This type of problem appears in more complex forms later, but a simple example, and a typical engineering or scientific problem, is the following: In a series of numbers 1, 4, 7, 10, 13, what is the pattern of rule by which they are being generated? The answer could be given in several ways. One is by adding 3 each time. Another is the nth number is $3 \times n + 1$.

The key, then, is to give a wide variety of mathematical experience and not to have everything in a limited and stringent fixed form. This is not an argument about teaching methods. The point is not that it will then be easier to teach the regular arithmetic (although, for all I know, that may be so). The point is, it will be teaching a new subject in a sense—an attitude of mind toward numbers and toward mathematical questions which is precisely that attitude of mind which is so successful later in technical applications of mathematics.

It will not do simply to teach new subjects in the old way. For example, it has been recommended that numbers written in a different base from 10 be discussed in the early grades. This could serve to illustrate the freedom in mathematics to generalize and help toward a deeper understanding of the reason behind the carrying rules in arithmetical operations. For this, a mention and an explanation with a few examples might delight some students. But if the matter is not understood by some of the slower members of the class, it is senseless to drill it in with interminable exercises, changing from one base to another. For such students, more practice in the usual rules of base-10 computation is surely more sensible than *drilling* to perfection, calculation in bases 5 and 12.

Words and Definitions

When we come to consider the words and definitions which children ought to learn, we should be careful not to teach "just" words. It is possible to give an illusion of knowledge by teaching the technical words which someone uses in a field (which sound unusual to ordinary ears) without at the same time teaching any ideas or facts using these words. Many of the math books that are suggested now are full of such nonsense—of carefully and precisely defined special words that are used by pure mathematicians in their most subtle and difficult anlyses, and are used by nobody else.

Secondly, the words which are used should be as close as possible to those in our everyday language; or, as a minimum requirement, they should be the very same words used, *at least,* by the users of mathematics in the sciences and in engineering.

Consider the subject of geometry. It is necessary in geometry to learn many new words related to the mathematics. For example, one must learn what a triangle is, a square, a circle, a straight line, an angle, and a curved line. But one should not be satisfied solely to learn the words. At least somewhere, one should learn *facts* about the objects to which the words refer, such as the area of the various figures; the relations of one figure to another; how to measure angles; possibly the fact that the sum of the angles of a triangle is 180°; possibly the theorem of Pythagoras; or maybe some of the rules that make triangles congruent; or other geometrical facts. *Which* facts may be decided by those having more experience with curric-

ulum, for I am not intending here to make any specific suggestions of what should be included and what not. I only mean to say that the subject of geometry, if it is taught at all, should include a reasonable knowledge of the geometrical figures over and above what the conventional names are.

Some of the books go a long way with the definition of a closed curve, open curve, closed regions, and open regions, and so on—and yet they teach no more geometry than the fact that a straight line drawn in a plane divides the plane into two pieces. At the end of some of these geometry books, look over to find, at the end of a long discourse or a long effort at learning, just what knowledge of geometry has been acquired. I think that often the total number of facts that are learned is very small, while the total number of new words is very great. This is unsatisfactory. Furthermore, there is a tendency in some of the books to use most peculiar words—the words that are used in the most technical jargon of the pure mathematician. I see no reason for this.

It will be very easy for students to learn the new words when, and if, they become pure mathematicians and discourse with other mathematicians on the fundamentals of geometry. It is very easy indeed to learn how to use such words in a new way when one is older. A great deal of the objection that parents have to the so-called new mathematics may well be merely that it sounds rather silly to them when they hear their child trying to explain to them that a straight line is a "curve." Such arguments in the home are absolutely unnecessary.

Precise Language

In regard to this question of words, there is also in the new mathematics books a great deal of talk about the value of precise language—such things as that one must be very careful to distinguish a number from a numeral and, in general, a symbol from the object that it represents. The real problem in speech is not *precise* language. The problem is *clear* language. The desire is to have the idea clearly communicated to the other person. It is only necessary to be precise when there is some doubt as to the meaning of a phrase, and then the precision should be put in the place where the doubt exists. It is really quite impossible to say anything with absolute precision unless that thing is so abstracted from the real world as to not represent any real thing.

Pure mathematics is just such an abstraction from the real world, and pure mathematics does have a special precise language for dealing with its own special and technical subjects. But this precise language is not precise in any sense if you deal with the real objects of the world, and it is overly pedantic and quite confusing to use it unless there are some special subtleties which have to be carefully distinguished.

A Fine Distinction

For example, one of the books pedantically insists on pointing out that a picture of a ball and a ball are not the same thing. I doubt that any child would make an error in this particular direction. It is therefore unnecessary to be precise in the language and to say in each case, "Color the picture of the ball red," whereas the ordinary book would say, "Color the ball red."

As a matter of fact, it is impossible to be precise; the increase in precision to "color the picture of the ball" begins to produce doubts, whereas, before that, there was no difficulty. The picture of a ball includes a circle and includes a background. Should we color the entire square area in which the ball image appears or just the part inside the circle of the ball? Coloring the ball red is clear. Coloring the picture of the ball red is somewhat confusing.

Although this sounds like a trivial example, this disease of increased precision rises in many of the textbooks to such a pitch that there are almost incomprehensibly complex sentences to say the very simplest thing. In a first grade book (a *primer*, in fact) I find a sentence of this type: "Find out if the set of the lollypops is equal in number to the set of girls"—whereas what is meant is: "Find out if there are just enough lollypops for the girls."

The parent will be frightened by this language. It says no more, and it says what it says in no more precise fashion than does the sentence: "Find out if there are just enough lollypops for the girls"—which is perfectly understandable to every child and every parent. There is no need for this nonsense of extra-spe-

cial language, simply because that type of language is used by pure mathematicians. One does not learn a subject by using the words that people who know the subject use in discussing it. One must learn how to handle the ideas and then, when the subtleties arise which require special language, that special language can be used and developed easily. In the meantime, clarity is the desire.

I believe that all of the exercises in all of the books, from the first to the eighth year, ought to be understandable to any ordinary adult—that is, the question of what one is trying to find out should be clear to every person. It may be that every adult is not able to *solve* all of the problems; perhaps they have forgotten their arithmetic, and they cannot readily obtain $\frac{2}{3}$ of $\frac{1}{4}$ of $1\frac{1}{3}$, but they at least should understand that that product is what one is trying to obtain.

By putting the special language into the books, one appears to be learning a different subject and the parent (including highly trained engineers) is unable to help the child or to understand what the thing is all about. Yet, such a lack of understanding is completely unnecessary and *no gain whatsoever* can be claimed for using unusual words when usual words are available, generally understood, and equally clear—often clearer.

New Definitions—and No Facts

I believe that every subject which is presented in the textbook should be presented in such a way that the purpose of the presentation is made evident. The reason why the subject is there should be clear; the utility of the subject and its relevance to the world must be made clear to the pupil.

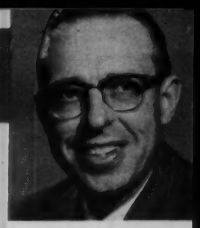
I would take, as an example, the subject of sets. In almost all of the textbooks which discuss sets, the material about sets is never used —nor is any explanation given as to why the concept is of any particular interest or utility. The only thing that is said is that "the concept of sets is very familiar." This is, in fact, true. The idea of sets is so familiar that I do not understand the need for the patient discussion of the subject over and over by several of the textbooks if they have no use for the sets at the end at all.

It is an example of the use of words, new definitions of new words, but in this particular case a most extreme example, because *no facts whatever* are given at the end in almost all of the books. A zookeeper, instructing his assistant to take the sick lizards out of the cage, could say, "Take that set of animals which is the intersection of the set of lizards with the set of sick animals out of the cage." This language is correct, precise, set theoretical language, but it says no more than, "Take the sick lizards out of the cage." The concept of things which have common properties by being a member of two groups (such as the Chinese Communists, or of a larger number of groups such as East German refugee children) does involve intersections of sets, but one does not use that language. No lack of precision results from this. And, besides, people who *use* mathematics in science or engineering never use the long sentences of our imaginary zookeeper.

If we would like to, we can and *do* say, "The answer is a whole number less than 9 and bigger than 6," but we do not have to say, "The answer is a member of the set which is the intersection of the set of those numbers which are larger than 6 and the set of numbers which are smaller than 9."

It will perhaps surprise most people who have studied these textbooks to discover that the symbol $\cup$ or $\cap$ representing union and intersection of sets and the special use of the brackets [ ] and so forth, all the elaborate notation for sets that is given in these books, almost never appear in any writings in theoretical physics, in engineering, in business arithmetic, computer design, or other places where mathematics is being used. I see no need or reason for this all to be explained or to be taught in school. It is not a useful way to express oneself. It is not a cogent and simple way. It is claimed to be precise, but precise for what purpose?

In the "new" mathematics, then, first *there must be freedom of thought;* second, *we do not want to teach just words;* and third, *subjects should not be introduced without explaining the purpose or reason,* or without giving any way in which the material could be really used to discover something interesting. I don't think it is worthwhile teaching such material.



JOHN R. EALES
SECTION EDITOR

Dr. Rafferty Names Students to Represent California in Senate Youth Program

By John R. Eales
Consultant in Secondary Education

Max Rafferty, Superintendent of Public Instruction, has named Norman A. Bowen of Las Lomas High School, Walnut Creek, and Daniel C. Snell of Skyline High School, Oakland, to

Norman A. Bowen

Daniel C. Snell

represent California in the fourth annual Senate Youth Program on January 23–29. The program provides outstanding senior high school student body officers from the 50 states with a one-week trip to Washington, D.C., as guests of the Senate. The purpose is to broaden their knowledge of Congress and the legislative process in the nation's capital, to demonstrate the importance of a freely elected legislature in the perpetuation of a democratic government, and to dramatize the role of the Senate. On their trip, students will visit with their state senators; meet with the President, members of his cabinet, and other government leaders; and tour Washington. All expenses are paid by the William Randolph Hearst Foundation.

The Senate Youth Program was established by Senate Resolution 324 of the 87th Congress and continued by Senate Resolution 311 of the 89th Congress.

The two students were chosen from candidates nominated, because of their grades, activities, and honors, by high school principals throughout the state and screened by committees of the California Association of Student Councils. Dr. Rafferty also named Steven Woodside of Hill High School, San Jose, as the first alternate and Dean Jost of Immanuel Academy, Reedley, as the second alternate to the winners.

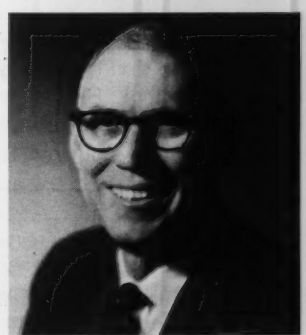
The other finalists, in alphabetical order, were:

Alma Alcala, Manteca High School; Banks Beasley, Helix High School (Grossmont); Carl Bryan, Hawthorne High School; Barbara Carr, Palo Alto High School; Ruth Cronkite, San Marcos High School (Santa Barbara); Steven Dodd, Arcadia High School; Anne Eggerbroten, East Bakersfield High School; Terry Ewing, Hueneme High School (Oxnard); James Foorman, Los Angeles High School; Joseph Friedman, Tamalpais High School (Mill Valley);

James Genasci, Loyalton High School; Norris Gregory III, San Bernardino High School; Gail Griffin, Grossmont High School; Terry Hackett, Sunny Hills High School (Fullerton); John Hayden, La Quinta High School (Garden Grove); Judy Higuchi, Watsonville High School; Stephen Jacobs, Orland High School; Joseph Jacobson, Antelope Valley High School (Lancaster); Charles Jennings, Lemoore High School; Naomi Kohatsu, Santa Maria High School;

Kenneth Lerch, Hayward High School; Bruce McKee, San Rafael Military Academy; Kathryn McKillop, Santa Ynez Valley High School; Wayne Olson, Marshall High School (Los Angeles); Jon Severson, Polytechnic High School (Long Beach); Peter Still, Thousand Oaks High School (Oxnard); Debbie Tanaka, Madera High School; Ralph Tarr, Foothill High School (Kern County); Henry Wellman, Twentynine Palms High School; and Michael Zagaris, Downey High School (Modesto).

In January, 1964, California was honored by having Everett Chaffee, Associate Superintend-



"Unparalleled citizenship training . . . Many of the students will undoubtedly be challenged to dedicate their lives to the political service of their country."
—Everett Chaffee

ent, Division of Instructional Services, Los Angeles City Schools, chosen as educator-observer in attendance at the Senate Youth Program in Washington. His reaction to the program:

> As educator-observor to the third annual United States Youth Program, I had the privilege of witnessing the participation of key high school students representing all of the states in a citizenship training activity unparalleled in my educational experience. Through the generosity of the William Randolph Hearst Foundation, the students were provided the opportunity of seeing at first hand our national government and its leaders in action. Keen interest and a penetrating analysis of the challenging problems of government were continually evidenced on the part of all student participants. Time alone, of course, will determine the overall values of the Senate Youth Program. Many of the students will undoubtedly be challenged to dedicate their lives to the political service of their country.
>
> As student leaders and conference participants, they will carry back to their respective states a keen understanding of governmental operation and a deep appreciation for the dedicated services of our nation's leaders.

PUPIL PERSONNEL SERVICES

Henry J. Heydt, Jr., has been appointed a consultant in Pupil Personnel Services. Before joining the Bureau of Pupil Personnel Services, he was administrative assistant in the Office of the Sutter County Superintendent of Schools, with responsibility for administering and coordinating guidance and pupil personnel services and other educational programs. Mr. Heydt has a B.S. degree from Fairleigh Dickinson University, New Jersey; he majored in psychology, business administration, and English. He is married and has five children.

Clyde F. (Al) *Powell* has been appointed a consultant in Pupil Personnel Services. Mr. Powell is the former assistant principal in charge of guidance services at Marina High School, Huntington Beach. Mr. Powell has an M.A. degree in education from Claremont Graduate School. He received his B.S. degree in chemistry from the University of Washington. He is married and has two children.

COLLEGE MERGER

Upland College has ceased operations at its Upland campus in California and merged with Messiah College, Grantham, Pennsylvania.

Distinguished Service Medal to Berthold Lowenfeld

Berthold Lowenfeld has been awarded the 1965 Ambrose Shotwell Distinguished Service Medal for "leadership and service to the blind."

Until 1964, Dr. Lowenfeld was Superintendent of the California School for the Blind, Berkeley. He now is engaged in a study of braille reading under the auspices of San Francisco State College. This particular project is financed by the United States Office of Education.

Dr. Lowenfeld was selected for the honor because of his many contributions to the education of blind children and adults; his published works, which include the book, *Our Blind Children—Growing and Learning with Them*; his service as consultant to federal and private agencies; and his outstanding contributions to teacher preparation programs throughout the country for the past 27 years.

Team Teaching Conference

The second annual Rowland Team Teaching Conference for elementary and junior high school educators will be held in Rowland Heights on February 26. Since the conference is limited to 800 participants, William B. Calton, Coordinator of Elementary Education for the Rowland School District, recommends that individuals preregister if they are interested in attending this conference.

Additional information and registration applications are available from Team Teaching Conference, Rowland School District, 1830 Nogales Street, Rowland Heights, California.

Math Examination Cancelled

After 20 years, the Stanford Competitive Examination in Mathematics has been discontinued, and no examination will be conducted this spring. This announcement from the Department of Mathematics of Stanford University is of particular interest to high school teachers, many of whom have made the Stanford Competitive Examination in Mathematics a regular part of their instructional program.

A Totem Pole for School Morale

By Gordon T. Griffiths
Principal, North Junior High School
Downey Unified School District

In the fall of 1963, the student council of North Junior High School decided that the morale of their school would be bolstered by a symbol that would rally student support. Because North's students are known as the Downey "Indians," they selected a totem pole as the school symbol. General Telephone Company agreed to donate a telephone pole, and a contest was held for the best drawing of a totem pole.

The drafting instructor, Herbert Korth, utilized the contest to provide advanced students with enrichment projects. He gave telephone pole dimensions to the students and assigned detailed two-view scale drawings. Many excellent drawings were submitted.

Next came the big question of which sketch would best serve as the working drawing. To stimulate effective overall student participation in this activity and to improve the homeroom program for the school as a whole, each homeroom class voted on the drawings and made suggestions for the best location of the pole for all to view.

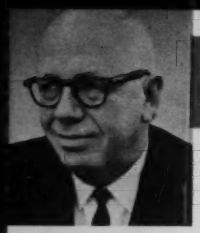
After they selected the winning design, the students showed great ingenuity and enthusiasm in completing this project. They submitted prints and working scale drawings to the Industrial Arts and Art Department. In making their drawings, students were able to correlate creative expression, research, and construction. This was a meaningful educational experience.

Students built a cradle to secure the pole while they carved it. Students and teachers, who volunteered their services before and after school, carved a large N, for North Junior High, at the top of the pole. Below the N they carved interesting and intricate head designs under the direction of John Fothergill, woodshop instructor, and Gaye Williams, crafts teacher.

After the carving had been completed, the art classes took over. Under the direction of the art teacher, Phil Hudson, the students painted each totem head with vivid yellows, reds, and blues, offset by white accents. To combat the ravages of sun and bad weather, the students used heavy marine paint, purchased and secured by the student council. To give a more finished look to the pole, metalcraft students cut sheet metal to cover its lower portion.

The totem pole was finally completed in the spring of 1965. The school spirit this project has engendered has never been higher. Student activities stimulate the development of school loyalties and assist in developing common interests that encourage that most important feeling of unity between the individual pupil and the school organization. Community relations also were strengthened by General Telephone's gift of the pole and publication, in the company's own magazine, of a feature story on the finished totem pole.

Today, more than ever in our country's history, developing loyalties should be one of our prime goals in education. The loyalties and sense of belonging which develop from student activities in a democracy can be encouraged, directed, and enlarged to include not only our schools and communities but our state and nation as well.



RAY H. JOHNSON
SECTION EDITOR

The State School Fund and the Sales and Use Tax

By Edgar B. Wicklander
Assistant Chief
Bureau of School Apportionments and Reports

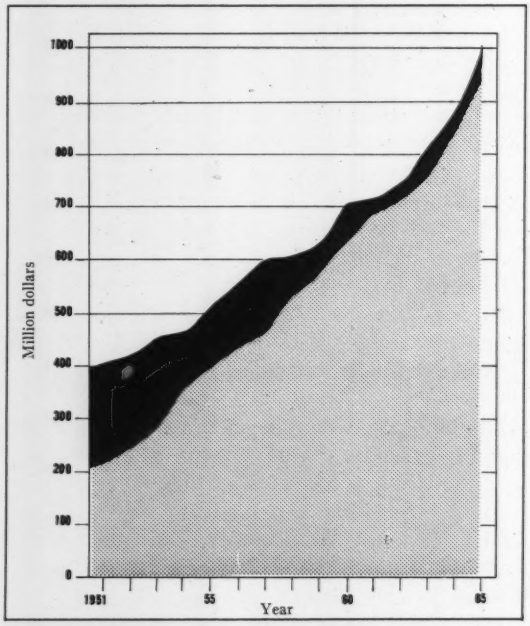
Financial support for California school districts is derived from two major sources: the State School Fund and local property taxes. The State School Fund, supported through appropriations made annually by the Legislature, is apportioned to the school districts on an equitable basis. The support the districts receive from taxes is determined by the assessed valuations and the rates of the districts. And since each district receives tax money on the basis of the assessed valuation and the tax rate of the district, wide variation exists between districts in the support received from these sources. The partnership of the state and the school district in regard to school support was formed in 1933 and has been in effect since that year.

Edgar B. Wicklander

Due to the depression in the early 1930s, the school districts found themselves with a high rate of delinquency in tax collection and consequently unable to meet satisfactorily the costs of education. The Legislature agreed to the general partnership; and effective August 1, 1933, it enacted the Retail Sales Tax provision to provide revenue for support of the schools. Prior to that date, the state's contribution to the school districts had been relatively nominal. In 1935 the sales provision was supplemented by the Use Tax Law. The tax rate since then has been either 2½ or 3 percent, and in recent years it has been 3 percent. An additional 1 percent is currently being collected in most counties and is returned to those counties for their own support. This tax system is generally known as the Riley-Stewart Plan.

The accompanying figure, "Comparison of State School Fund Apportionments and State Sales and Use Tax Collections, 1951–1965," presents a graphic picture of the distributions to the school districts over a 15-year period and the tax collections for those same years. There is no direct relationship, but the sales and use tax collections constitute the largest single source of revenue to the State General Fund, and the apportionments from the State General Fund to the State School Fund for the school districts is the largest single expenditure from the State General Fund. It should be noted that the state support of school districts through the State School Fund is further augmented by a variety of grants. Such grants, which are not included in the apportionments shown in the figure, were approximately $106 million for the fiscal year 1963–64.

Comparison of State School Fund Apportionments and Sales and Use Tax Collections, 1951–1965



ANNE L. UPTON
SECTION EDITOR

Claremont Unified Tries Local Norming

By Robert H. Oyler
School Psychologist
Claremont Unified School District
Los Angeles County

"Our tests are satisfactory, but our *interpretation* of them needs much improvement." This is a frequently heard comment when pupils' test scores seem to depart enough from normal distribution or the publisher's norms to pose problems that make it difficult to secure a satisfactory interpretation of the test results without first establishing norms for local use.

Robert H. Oyler

Such was the case in the Claremont Unified School District, where it has not been uncommon to have consistently high test scores (according to publisher's grade placements or national percentiles), which are questioned by members of the governing board, parents, teachers, counselors, and the students themselves. A typical parent reaction was: "I know my child has weaknesses, but all of his scores are in the 90th percentile. The test must be too easy!" Consultation with publisher representatives was often disconcerting, in that 20 or more students of 250–300 made scores supposedly expected once in 100,000 times. Teachers often noticed that the performances by their classes produced a skewed curve about differences in academic performance according to sex.

Help Is Sought

To investigate these deviations from the norms, the Claremont school district received an NDEA grant for a team of experts to evaluate the test scores in 1959–60. These experts confirmed the district staff's assessment of need for local norms for a group test. After conferring with the Division of Research and Guidance in the office of the Los Angeles County Superintendent of Schools and reviewing several National Defense Education Act, Title V, projects, Claremont began to hand-tabulate raw scores for several graduating classes tested at the same time of year, on the same tests, and in the same grades.

Claremont received another NDEA grant to support employment of a statistical clerk, whose first task was to help construct a test-summary filing system for the entire district and to help establish the procedures for its use. Districtwide data had never been collected systematically in one place, and at the time, only secondary schools in Claremont were utilizing machine-scoring services. Teachers in four elementary schools were testing, hand-scoring, and interpreting tests without much reference to each other. Two or three classes in one building constituted the largest possible comparison group. These varied practices concerning testing in the elementary schools made the placement of pupils from the elementary schools to one junior high school rather haphazard. In addition, such practices placed inappropriate burdens upon teachers and principals. A districtwide test-summary filing system would have avoided many of the problems.

Data Are Gathered

As a guide to the gathering of data necessary for establishing local norms, the school psychologist designed statistical worksheets intended to permit (1) step-by-step instructions to the statistical clerk; (2) quick, but independent, verification of calculations; (3) some economy of effort and time; and (4) maximum use of the statistical clerk.

Up-to-date electronic data processing now can accomplish these computations far more rapidly than can procedures described herein. However, the "facts of (school) life" were that no private, local service bureau available at that time was *both* experienced enough and well equipped enough in educational applications to do the work within the limited guidance budget available. The statistical clerk's

use of the worksheets was analogous to the coding, testing, and computational phases of computer programming and operation; the school psychologist's activity with the forms was somewhat similar to systems analysis and program design phases. These compromise procedures were built into five worksheets entitled:

"Tabulation Form" (establishing separate frequency distributions of raw scores for boys and girls, subtest by subtest)

"Mean Computation Form" ("coded" grouped data)

"Standard Deviation Form" (grouped data)

"Cumulative Frequency—Percentile Form" (giving final "local percentile score" for raw scores, boys' scores separate from girls')

"Conversion Tables" (indicating to County Statistical Section both local percentile and publisher grade placement equivalents for all possible raw scores, subtest by subtest)

Actual experience in the procedures (district a.d.a. was approximately 4,000 at the time) revealed over 70 distributions to be handled in this manner, each involving 340–562 boys' or girls' scores on a given subtest. Working without interruptions (a strictly hypothetical condition) and following tabulation in frequency distributions, the statistical clerk and school psychologist averaged two subtests (four distributions) completed and verified per day. A desk calculator was used for extra speed and for accuracy checks made possible with printing tape. The district's minimum testing program was stabilized for over four years, and tests regularly employed by the district included the following:

California Achievement Test (grades two, four, six)

California Test of Mental Maturity (grades two, four, six, ten)

Iowa Tests of Educational Development (grades eight, eleven)

Kuder Preference Record, Vocational (grade nine)

Differential Aptitude Test Battery (grade ten)

General Aptitude Test Battery (grade twelve)

Otis Quick-Scoring Mental Ability Test (grade twelve)

School and College Ability Tests, forms 1A and 1B (grade twelve)

Benefits Accrue

Benefits accrued at this intermediate stage, even though the process was not perfected. It was possible immediately to pick out *local* performance or test discrimination peculiarities at various grades on various tests and subtests. For example, in a certain grade 20 percent or more of the pupils taking an addition test made perfect raw scores or missed only one question, while less than 1 percent of the same group did as well on a multiplication test. Implications for assessment of arithmetic skills by teachers and for instruction were discussed by the staff. As another illustration, in spelling, the median raw score for local girls in a given grade was compared with the median for boys in the same grade. In grade placement units, girls were found to be nine school months or more ahead of boys in the same classes.

The final phase of development involved punching "master decks" of cards from conversion table worksheets to permit both percentile and grade placement equivalents for all possible raw scores to be printed automatically —on alphabetical rosters or upon gummed labels for cumulative records. The statistical section of the office of the Los Angeles County Superintendent of Schools rendered these services.

Custom-made labels for achievement and scholastic aptitude tests were purchased. These labels included only those subtests or tests which discriminate effectively in this particular district. However, *both* publisher grade placements and local percentiles are printed on the labels, since transfer of cumulative records between this district and other districts does occur.

Teacher time previously used in recording test results is now devoted to improving interpretation and to preparing for parent conferences at the end of the first quarter. Comparisons of students of the same sex in districtwide

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JOHN G. CHURCH
SECTION EDITOR

Social Sciences in the Eighth Grade—Government in Action

By Marvin Morganti
Curriculum Consultant
Laguna Salada Union Elementary School District

The Laguna Salada School District, situated a few miles south of San Francisco, can be considered a typical fast-growing suburban district. The district now has 13 schools, kindergarten through the eighth grade. And in three of these schools, team teaching is employed. The population growth of the district is rapid; the enthusiasm for excellence in education, high. Under the guidance of Fred E. Lucas, District Superintendent, and Lucille Foster, Assistant Superintendent in Charge of Education, the district follows a philosophy of encouraging teachers to explore new avenues of learning. In keeping with the district theme of the year, "creativity," four teachers of eighth grade classes, two in one school and two in another, embarked in the fall of 1964 on a unique unit of study to teach "real" government by participation. In this endeavor they were able to give the study of United States history, geography, and civics a new depth of meaning for their pupils; they taught "democracy in action."

Marvin Morganti

Since only a few city blocks in Pacifica separate the two schools, the four teachers, Don Beck, John Frisk, Leslie Linhares, and Ellen Mohr, decided to work together to "plant the seed" of a student-organized political party system. Because our national government is based on the two-party system, they encouraged their 125 pupils to form two parties.

At the Cabrillo Elementary School, under Miss Linhares and Mr. Frisk, pupils formed the Eaglist Party and then divided themselves into state groups. Each state elected a governor and other officials and each produced a state song, motto, and emblem and named a state flower.

Under the guidance of Miss Mohr and Mr. Beck, the eighth grade pupils at Pedro Valley School formed the Strength Party and also established states and the necessary state regalia.

The pupils held state conventions and mammoth, enthusiastic party conventions, replete with banners, songs, placards, and mottoes, in the two schools' multipurpose rooms. After adopting its platform, each party took definite stands on current national and world problems and chose candidates to lead the party to victory. An intensive period of campaigning ensued. Candidates met to debate such matters as civil rights, foreign aid, and the war in Viet Nam before the entire citizenry of the eighth grades.

In March, six months after the inception of the activity unit, pupils held their election, with secret ballots, ballot boxes, and voting booths. The victors were announced in the student newspapers.

Prior to his inauguration, the president-elect appointed his cabinet and chief justice, who administered the oath to the president and other newly elected officials on April 2.

The president presented an inaugural address, which was followed by an inaugural ball. School district officials and city government leaders received formal invitations to the event, which was conducted according to the instructions of the pupil committee on protocol. The local newspaper reported the event:

> President Mattson won election in a spirited campaign which has engaged the eighth graders for weeks and included tumultuous conventions of two political parties—the Eaglist party and the Strength party.
>
> The president's inaugural address indicated the youngsters took their roles seriously. He pledged to work to rid the world of "hate, aggression, poverty and discrimination," and that "as long as I can help it and there is a communist threat, we will stay and help the people of Viet Nam."

. . . . . .

ONE OF Mattson's appointments was of Debbie Reynolds [his opponent in the election] to be Chief of Protocol, who promptly began planning the inaugural ceremony, held last Friday night. Following the impressive inaugural and introduction of all officeholders, there was an inaugural ball, with eighth graders in their Sunday best taking part in an elaborate grand march and social dancing later.

It was two-party politics in action—from campaigning to dancing. The whole affair was acclaimed a huge success.

During the school year, the pupils also were doing their daily social science lessons, using the state-adopted textbooks, *The Story of the American Nation, Our U.S. in a World of Neighbors,* and *Government of a Free Nation.*

These pupils made better-than-average scores in the state-required history and civics tests given during the school year. Yet, the teachers put little emphasis on the tests and exerted no pressure to pass them. And pupils apparently took the examinations with little anxiety. As the pupils expressed it, in a press release.

We eighth graders look forward to a continuance of our political action and feel it can be a positive factor in development of some of the future leaders of this, our country, the United States of America.

LOCAL NORMING

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groups are now feasible and tend to be significant.

Other Results Cited

How worthwhile such an effort is, is best assessed by its practical applications. The following results are more recent than procedures described herein, and new applications are being discovered by the staff:

- More precise reports on student population characteristics have been made to the administration and to a central curriculum committee. Resultant discussions have involved: (1) implications for current instructional practices; (2) significance for assessment of skills; and (3) special education plants and establishment.
- Additional inservice training and supervision has been recognized as necessary in the following areas and has been well received: (1) preparation and interpretation of test results for purposes of instruction; (2) discussion of test result in parent conferences; and (3) significance of districtwide norms for student placement and scheduling by counselors.
- Transition (elementary to junior high level) and articulation procedures have been reexamined by the counselors and as a result they are now more secure in their positions when they place students in high sections of one subject field or low sections of another.
- Parents appear to appreciate two answers to the common conference question, "How does my child's work compare with other children's?" Teachers can respond with both local and other standard comparisons, which (together) seem to clarify discrepancies mentioned in the introduction of this article.
- Local norms also appear to be pertinent in screening the student body for the gifted and educable mentally retarded. We have become more aware of the needs of students of borderline-normal and low-average capacity, and are currently studying our group screening criteria.
- The local data have helped administrators in making decisions regarding: (1) grading practices and home reports; (2) allocation of, and additions to, the psychometrist's time in special education identification testing; and (3) test administration.
- IBM data-processes and computer programs have been established to replace handwork.
- Results have been of some assistance in team teaching and ungraded elementary groupings.

Problems Are Identified

As with any new procedure involving an entire staff and requiring use of unfamiliar equipment, certain problems have arisen. The following problem areas may be typically associated with the local norming venture:

- Updating—how often? This depends on test reliability, new publisher norms, size of "N," and the like. We plan to update percentile norms every three years, and to tabulate in frequency distributions yearly.
- Development of a single summary document for best communication of cumulative test performances to staff, parents, and students (*e.g.*, "stanine," "decile" or "C" Scale card) may be desirable when district population is not transient.
- Requirement to "freeze" the local testing program for three to five years must be considered.
- Lack of relationship and economy in operating both a stabilized minimum testing program at the local level and the mandatory statewide testing program provide difficulty.
- Testing must occur prior to the peak of service load to other districts and statewide testing period (October-November) to have results available in November parent conferences.
- Staff desire for additional procedures describing variability and central tendency of smaller, annual groups (*e.g.*, individual classroom or school building) is stimulated.

TOM SHELLHAMMER
SECTION EDITOR

ESEA, Title I, Compensatory Education Projects—with Special Reference to Progress Evaluation

By Tom Shellhammer
Compensatory Education—Program Evaluation
Office of Compensatory Education

The major thrust of the Elementary and Secondary Education Act of 1965, which was signed by the President on September 23, lies in Title I. This title authorizes federal support to school districts for the development and operation of educational programs that are designed to meet the needs of educationally deprived children who reside in attendance areas where low-income families are concentrated. Its aim is to help broaden and strengthen education for the children of poverty wherever they may be found—in public schools, in private schools, or out of school.

Title I projects must be focused on pupil needs, and the law directs that evaluations and reports of progress in meeting these needs must be made at least annually. The main question these reports must answer is this: has the educational attainment (or achievement) of children participating in a Title I project been raised? The only way this question can be answered by school districts is for them to define what they mean by attainment (largely through specific objectives) and then to try to measure the attainment in terms of the objectives.

The California State Department of Education has prepared some guidelines for compensatory education programs and projects. A portion of the brochure containing these guidelines relates to evaluating the effectiveness of Title I projects under the Elementary and Secondary Education Act of 1965. This article is based, in part, on some of the technical evaluation recommendations developed in these guidelines.

Federal and State Regulations

According to Title I of the Elementary and Secondary Education Act, a project application by a school district must include a description of the procedures and techniques to be utilized in making an annual evaluation of the effectiveness of its compensatory education program. In all instances, data collected through the use of appropriate objective measures of the pupil's educational achievement must be used as one of the bases for the evaluation, since a primary objective of any project for disadvantaged children must be to meet their special needs so that they may progress educationally at rates and to levels commensurate with their abilities. The new act also requires local educational agencies to report to the State Department of Education regarding the educational achievement of students participating in programs carried out under Title I of ESEA.

The McAteer Act, which was passed by the 1965 California Legislature and which relates to programs in compensatory education, also calls for an annual evaluation of the effectiveness of school district programs designed to meet the educational needs of educationally deprived children.

Evaluation of Pupil Progress

If progress in educational achievement of deprived children is to be measured, then a clear baseline must be established; and to establish this baseline, objective measures of the educational deprivation of such children must be identified. Measuring objectively the effect of ESEA, Title I, programs have in meeting the needs of these pupils will be a tremendous educational innovation and will require careful thought and consideration by those charged with administering the programs. It will be vitally important for evaluative data to be recorded from the very beginning of the programs.

It is assumed that the evaluative aspects of Title I programs will be planned and coordinated with the curriculum and instructional components throughout all phases of a particular compensatory education project. The following guides are presented for those charged with the responsibility of providing or obtaining

technical assistance in planning and conducting appropriate evaluative and data-collection techniques:

- Federal and state legislation making funds available for compensatory education *require* that educational achievement be measured and evaluation of the programs be made.
- Satisfactory evaluation procedures must be provided before a project application is approved.
- Each application should describe procedures and techniques to be utilized in making an evaluation at least annually of the effectiveness of the program in meeting the special educational needs of educationally disadvantaged children.
- The evaluation of the effectiveness of the program should include data describing the increase in educational opportunities afforded by the projects comprising the program.
- Evaluation required by the legislation must be designed as an integral and pertinent aspect of the local project. When local educational agencies do not have available staff competent in the design and conduct of evaluation studies, it is *strongly recommended that consultant assistance be obtained to assist in the development of the project proposal and application.*
- Appropriate objective measurements of educational achievement are to be included in the evaluation.
- The measurement of educational achievement should include a procedure for measuring or describing by some objective standard or norm the educational deprivation of the children who will participate in the program.
- The school district *shall* make an annual report, including information relating to the educational achievement of students and necessary descriptions of the program, to assure that the State Department of Education may verify, summarize, and analyze the conduct of the local programs to the U.S. Commissioner of Education.

Suggested Evaluative Devices

The varied aspects of pupil growth—intellectual, personal-social, physical, and attitudinal—suggest that a variety of assessments may be needed to evaluate adequately the results of a particular project or program. The development of information for parents, parental attitudes, appreciation, and participation are also possible areas for data-gathering and evaluation. It is essential that every effort be made to select or develop data-collecting procedures which will provide information related to the specific objectives of the school district's project. Probably the instruments most used in evaluating the effectiveness of special school projects are standardized tests, nonstandardized tests, ratings, questionnaires, and anecdotal records.

Tests are among the most important evaluative and prognostic tools that educators have at their disposal. Like axes, however, they can be useful tools or deadly weapons. In testing the socially and culturally disadvantaged child, it is sometimes appropriate to compare his performance with that of a control group of advantaged children to determine the magnitude of the deprivation to be overcome. At other times, it is appropriate to compare his test performance with that of other disadvantaged children to determine his relative deprivation in comparison with others who perhaps also have been deprived of good homes, good neighborhoods, good diets, good preparation for school, and good schools. In most instances, it is especially important to compare the child's test performance with his previous test performance. Examples of other sources of information, means, and measurement instruments that may be useful in the required evaluation are:

> Anecdotal records, attendance records, attitude inventories or questionnaires or scales, autobiographies, checklists or checksheets, diaries, directed observations, expert testimony or jury of experts, filmstrips, health records, interest inventories, interviews and interview schedules, learner products (e.g., themes, paintings, laboratory specimens), logs, marks (other report card data), motion pictures, photographs, questionnaires, ratings and rating scales, recordings, self-report inventories, sociograms and related sociometric devices, tests (nonstandardized achievement-performance-projective-performance-situational-standardized), time sampling, taped interviews, and trained observations.

Summary

Title I of the Elementary and Secondary Education Act of 1965 has been designed to encourage and support the establishment, expansion, and improvement of special programs to meet the needs of educationally deprived children of low-income families. The federal government has made $77,886,286 available to California for the current school year to carry out the intent of the act.

The Department of Education has set the machinery in action for distributing the funds. School districts have established projects within the framework of the act. Children from low-

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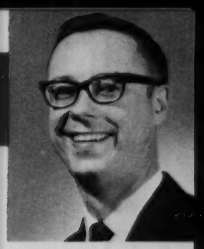
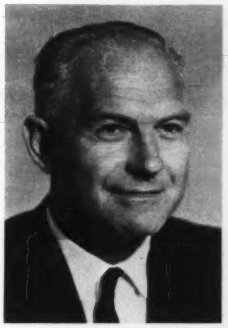


JERRY LEVENDOWSKI
SECTION EDITOR

Modern Agriculture Presents Challenges in Teacher Education

By E. M. Juergenson
Associate Professor of Agricultural Education
University of California, Davis

Traditionally, teacher education programs in agriculture have been designed to prepare individuals to teach "production" agriculture, but today California agriculture encompassses much more than production farming. The number of persons actually engaged in producing farm products is small and getting smaller; however, the number engaged in such related occupations as marketing and processing, and the contribution of these occupations to the gross national income, make agriculture not only California's but also the nation's largest industry. Thus, it is highly important that teacher education programs in agriculture be designed to give prospective instructors the training they will need to teach students who are planning for careers in modern agriculture.



E. M. Juergenson

Changes in Agriculture

To make courses in agriculture meaningful, teachers must not only make their students aware of the changes taking place in the industry, but they must also be prepared to teach the significance of such developments. At present, teachers of agriculture must be particularly aware of the following changes:

- To be profitable, modern agriculture must be very efficient. For example, a calf crop of 50 to 60 percent used to be average and profitable, but today's cattle ranch needs a crop of 90 percent or more to make a profit. This need for efficiency has required farms that are mechanized, specialized, and larger.
- The most spectacular agricultural advance is in mechanization. Some crops are produced with no hand labor, and machines are harvesting tomatoes, asparagus, grapes, and other crops that once seemed impossible to handle mechanically.
- Farms are single-cropped and intensively farmed rather than diversified. In the past, for example, each farm had a few chickens. Today, most farms have no chickens, but when they do, the number of birds may run into the hundreds of thousands.
- Farms are fewer and larger. The family farm still exists, but it is much larger and better organized; in operation it resembles a large corporation.
- New crops, unheard of just a few years ago, are now important commodities. Safflower and many new range grasses are prime examples.
- New enterprises have extended the field of agriculture. New methods of food processing, for example, have created industries unknown in the past. Landscape horticulture has become a major business. New occupations emerging from the areas of recreation and turf grass management have changed the image of the world of agriculture.

Implications for Education

These changes have great significance and implications for education in agriculture, and preparing youths for their place in this vast industry is the first task of today's teachers of agriculture. The nature and structure of agriculture require that persons seeking employment in the production phase or in the related occupations be highly trained. Therefore, in addition to preparing students for employment after high school graduation, agricultural educators must also prepare students for entrance into college.

The new opportunities for development of programs in the agricultural-related occupations have created a demand for programs which include girls as well as boys. Agricultural education must assume a greater responsibility to provide instruction to prepare girls for these employment opportunities. (Girls already outnumber boys in some agriculture classes, and in the future may be included in Future Farmers of America, currently an all-boy organization.)

As the related occupations grow in number and the need for training increases, schools

must accept the reality of larger class sizes and more specialized instructional programs.

As the emphases in agricultural education extend beyond production technology to employability, the need for specialized training and the study of the problems facing agriculture must be included in the curriculum. These goals must also be reflected in outside activities. The traditional project in production farming—despite the glamour of fairs, shows, and competition—no longer provides the only vocational experience for agricultural students. Instead, supervised work experience education may better meet the needs of individual students to make them employable and able to live happily in society.

Because so much information is now available in agriculture, and because the problems in agriculture are changing so rapidly, agricultural education must emphasize underlying principles rather than specifics. The program must be flexible, with plans of operation applied one year at a time as goals are defined and redefined. Most important, each program must be evaluated to determine its success in meeting the goals.

In addition to the changes already identified, a change in the Smith-Hughes Act also has direct implications for education in agriculture. The Vocational Education Act of 1963 amended the Smith-Hughes Act so that programs for preparing persons for any agricultural-related occupation be eligible for federal support. The Smith-Hughes Act restricted such support to programs designed for persons preparing for "work on the farm or of the farm home." A number of school districts have already established programs in agricultural-related occupations under the Vocational Education Act of 1963.

Another significant feature of the new act is that it does not restrict supervised practice to farming but also recognizes such practice in agricultural-related occupations.

Implications for New Teachers

Teachers of agricultural education must have the preparation they need to plan and operate effectively under changing conditions. Teacher education methods that worked in the past may not be appropriate now, and practice teaching opportunities of the type now employed may be inadequate—possibly inappropriate. In their instruction, teachers will have to emphasize employability, special training, and problems facing "production" agriculture and the agricultural-related industries. They will have to be more specialized in their agricultural area, better grounded in the skills of that area, and able to communicate with farmers on a sophisticated level. One solution may be to have student teachers participate in pilot programs, testing the validity of the new approaches, techniques, and expanded programs in cooperating schools.

Recruitment of future teachers takes on new dimensions as the provisions of new legislation are put into action. New teachers will have to be able to demonstrate technical competence if employability is a major goal for their students. Therefore, recruitment must reach into the ranks of those already employed as well as of the newly graduated from teacher education institutions. To attract teachers from related industries, the salaries and fringe benefits offered will have to be competitive with those offered in nonteaching fields.

Teacher education institutions and the many schools providing practice teaching for agricultural teachers must work toward building in each new teacher a philosophy that reflects the needs of each student desiring a career in agriculture and that provides realistic approaches to meet the needs.

COMPENSATORY EDUCATION

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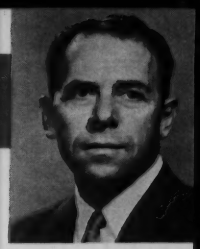
income families are now enrolled in some of the special programs set up under the act. However, merely passing a bill, appropriating money, writing guidelines, establishing projects, and enrolling children will not in and of themselves meet the needs of these children.

If this act is successful in moving educationally deprived children forward on the long, hard road of overcoming the deficiencies which have been forced upon them, it will be because all involved are able to identify and evaluate the successes and failures in the projects. The territory ahead for Title I is uncharted; the evaluative devices established today will plot the map future generations use in helping the disadvantaged child.



MILTON BABITZ
SECTION EDITOR

Duties and Titles of Administrative Personnel in Adult Education

By John W. Myres
Vice-Principal, Ponderosa High School
El Dorado Union High School District

As adult education has become a clearly identified part of public education in California, it has increasingly become a subject for educational research.

John W. Myres

Last May, at the University of Southern California, the author completed his doctoral dissertation on "Administrative Personnel in Adult Education." The chief purposes of the study were:

- To identify the duties of administrative personnel in adult education programs
- To identify the patterns of administrative organization of adult education programs
- To develop appropriate functions for chief adult education administrators
- To develop appropriate patterns of administrative organization for adult education programs

The study was based on responses to questionnaires sent to 96 California school districts that maintained evening high school programs and 58 junior colleges. The overall response to the questionnaires was 84 percent. Some findings of the study were:

1. Most adult evening high school chief administrators use the title "principal" (35 of 62 school districts); junior college administrators use "dean" (12 of 16 districts); and the administrators of combined programs use largely double titles involving "dean," "director," and "principal."
2. Chief administrators of adult education programs perform functions related to program improvement in all 78 school districts reporting (largely curriculum); those of smaller size programs perform more functions related to pupil personnel; those of larger size programs perform more functions related to program promotion.
3. Part-time administrators are used extensively in adult education programs. In the 62 high school districts reporting, 178 part-time administrative personnel supplement the services of the full-time administrator.
4. The largest number of administrative personnel, exclusive of chief administrators are counselors (121 out of 178).
5. Virtually all administrative personnel, regardless of title, perform functions related to counseling.
6. A district having a typical adult evening high school program utilizes a full-time chief administrator, called either "principal or "director," and one or more part- or full-time administrators, depending on the size of the program. Part-time administrators are usually called "counselor"; full-time personnel, "vice-principal" or "assistant principal."
7. A district having a typical junior college adult education program utilizes a full-time chief administrator, usually bearing the title of "dean," and depending on the size of the program, one or more full- or part-time administrators. Full-time personnel are usually called "dean"; part-time personnel, "counselor" or some designation other than dean.
8. Adult education administrative personnel, especially in a smaller program, tend to report directly to their chief adult education administrator. Chief adult education administrators tend to report directly to their district superintendent or college president.

Recommendations concerning the functions of chief adult education administrators and patterns of administrative organization were obtained by submitting a second questionnaire to administrators of some reputation with ex-

perience in adult education. Included among a number of their recommendations were:

1. Unified school districts having a junior college and one or more high schools should have a unified program of adult education with a single director.
2. High school districts having adult education programs should maintain such programs even though the districts would come to be served by a junior college.
3. "Principal" should be the title of an adult evening high school administrator having responsibility for a single unit or campus; "director," of an adult evening high school or junior college administrator having responsibility for several units or campuses; "dean," of a junior college administrator.
4. The chief administrator should report directly to the district superintendent or to the junior college president.
5. The chief administrator should be a member of the superintendent's cabinet.
6. The most important functions of chief administrators are curriculum development, personnel administration, and community relations.
7. In smaller programs, chief administrators should be performing functions particularly in the areas of program improvement, plant management, and program promotion. Pupil personnel matters should be delegated to the counselor.
8. As an adult education program increases in size, the chief administrator should become more of a policymaker and more concerned with public and community relations.
9. As an adult education program increases in size and necessitates additional personnel beyond a chief administrator and clerical staff, the first person added should be a counselor; the second, a vice-principal, assistant principal, or dean; the third, another counselor or personnel for special subject areas.

Teaching Aids Offered

Free teaching aids on the subject of insurance are being offered by the Insurance Information Institute. The materials, which present fundamentals of property and liability insurance and career opportunities in insurance, consist of printed materials, filmstrips, a motion picture, bulletin board charts, and sample insurance policies. These aids are suitable for use in high school courses in driver education, home economics, and business education.

A complete listing is available from the Director of Educational Relations, Insurance Information Institute, 110 William Street, New York, N.Y. 10038.

Openings in Department

The following postions in the Department will be filled by examination:

Title	*Monthly salary range*	*Filing date*
Assistant Chief, Bureau of Junior College Vocational-Technical Education	$1,058–1,286	2/25/66
Chief, Bureau of Junior College Administration and Finance	$1,166–1,419	2/18/66
Chief, Bureau of Junior College General Education	$1,166–1,419	2/11/66
Chief, Bureau of Junior College Vocational-Technical Education	$1,166–1,419	2/25/66
Consultant in the Education of the Mentally Retarded	$1,008–1,225	2/11/66
Curriculum Specialist in Education of Mentally Retarded Children	$1,111–1,351	2/18/66
Librarian I	$510– 562	3/11/66

For additional information regarding these openings, visit the Personnel Office of the State Department of Education or write Kenneth J. Sanger, State Personnel Board, 801 Capitol Mall, Sacramento 95814.

Institute on Elementary English

For the first time, elementary language arts will be emphasized exclusively in the 1966 Spring Institutes of the National Council of Teachers of English.

The NCTE is sponsoring five institutes throughout the country. The western institute will be held at Santa Barbara February 12–15.

Further information is available from Spring Institutes, NCTE, 508 South 6th Street, Champaign, Illinois 61822.

JUNIOR COLLEGE EDUCATION

BLAIR HURD
SECTION EDITOR

Junior College District Organization

By Ronald W. Cox
Associate Superintendent and Chief
Division of Public School Administration

California leads all states in the number of junior colleges and the number of students served by these institutions. During the 1964–65 fiscal year, 56 junior college districts, 2 high school districts, and 8 unified districts maintained 75 separate junior college campuses and enrolled one-half of all junior college students in the nation. The continued growth of California's population and its commitment to provide opportunity for higher education to all who can profit therefrom will necessitate the organization of new junior college districts, the reorganization of some districts presently maintaining junior colleges, the establishment of new campuses, and the expansion of existing facilities.

Ronald W. Cox

The state Legislature has stated its intent that all territory of the state be included in junior college districts. And it has established September 15, 1967, as the deadline for county committees on school district reorganization to make proposals to the State Board of Education for the inclusion of all territory of their counties in junior college districts. If this requirement is not met by county committees, the responsibility to make such proposals falls upon the State Department of Education. The Legislature's intent is that all territories within the state become a part of a junior college district shortly after the established deadline date.

During the 1964–65 fiscal year, one or more junior college districts encompassed all the territory under the jurisdiction of the county superintendent of schools in the following 25 counties of the state:

Contra Costa	Imperial
Fresno	Kern
Humboldt	Kings
Madera	Santa Barbara
Monterey	Santa Clara
Nevada	Santa Cruz
Placer	Shasta
Sacramento	Solano
San Benito	Sonoma
San Francisco	Stanislaus
San Joaquin	Tuolumne
San Luis Obispo	Ventura
	Yuba

In 15 counties of the state, one or more districts maintained a junior college in 1964–65, but not all of the territory of the county was in a district that maintained a junior college. The following tabulation lists for each of these counties the existing junior college districts and the high school or unified districts that were not a part of a junior college district. High school districts maintaining a junior college are indicated by (H). Unified school districts maintaining a junior college are indicated by (U). Asterisks indicate that these school districts will be included in a junior college district subject to approval by voters in the district.

Junior college districts	*Elementary, high school, and unified districts not part of a junior college district*
ALAMEDA COUNTY	
Peralta and South County	Fremont Unified,* New Haven Unified, and Newark Unified *
EL DORADO	
Los Rios	Tahoe Valley Unified
LASSEN	
Lassen	Big Valley Unified and Westwood Unified
LOS ANGELES	
Antelope Valley, Cerritos, Citrus, Compton, El Camino, Glendale (U), Long Beach (U), Los Angeles, Mt. San Antonio, Pasadena, Rio Honda, and Santa Monica (U)	El Monte High School and William S. Hart High School

	MARIN
Marin	Tomales High School
	MERCED
Merced	Los Banos High School
	NAPA
Napa	St. Helena Unified, Calistoga Unified, Howell Mountain Elementary, and Pope Valley Elementary
	ORANGE
North Orange County, Orange Coast, and Santa Ana	Capistrano Unified, Garden Grove Unified,* Laguna Beach Unified, Orange Unified,* and Tustin Union High School
	RIVERSIDE
Coachella Valley, Mt. San Jacinto, Palo Verde (U), and Riverside	Corona Unified, Elsinore High School, and Perris High School
	SAN BERNARDINO
Barstow, Chaffey, San Bernardino Valley, and Victor Valley	Bear Valley Unified, Chino Unified, Morongo Unified, Needles Unified, and Trona Unified
	SAN DIEGO
Grossmont, Oceanside-Carlsbad, Palomar, San Diego (U), and Sweetwater	Coronado Unified, Borrego Springs Unified, Julian High School, Mountain Empire Unified, Ramona Unified, and San Dieguito High School
	SAN MATEO
San Mateo	La Honda-Pescadero Unified
	SISKIYOU
Siskiyou	Etna Unified High School and Tulelake High School
	TULARE
Porterville (H) and Sequoias	Strathmore High School
	YOLO
Los Rios	Esparto Unified, Winters Unified, and Woodland Unified

In the remaining 18 counties of the state, there were no school districts that maintained a junior college during the 1964–65 fiscal year, although a successful election was held on December 7, 1965, to form a junior college district from the territories of Colusa, Sutter, and Yuba counties. An election will be held on February 15, 1965, to form a junior college district in the territory of Mendocino County. California counties having no school districts maintaining a junior college in 1964–65 were:

Alpine	Mariposa
Amador	Mendocino
Butte	Modoc
Calaveras	Mono
Colusa	Plumas
Del Norte	Sierra
Glenn	Sutter
Inyo	Tehama
Lake	Trinity

During the last completed fiscal year, 1964–65, 85.66 percent of the total assessed valuation of the state was included in districts maintaining a junior college, and 90 percent of junior college enrollments resided in districts maintaining a junior college. In 1961–62, 75.3 percent of the total assessed valuation of the state was included in districts maintaining junior colleges, and 80.1 percent of junior college enrollments resided in junior college districts.

The demand for junior college services in each area of the state is growing. In addition, by design, and probably because of the junior colleges, entrance requirements for state colleges and the University of California are becoming more rigid. Therefore, the junior colleges must prepare for increasing regular enrollments plus those diverted from other higher public education facilities. Acceleration of activities to include all territory in junior college districts and to achieve expansion of facilities in existing junior college districts is needed.

A number of legislative measures have been enacted to aid junior colleges in meeting the demand for increased facilities and educational services:

- In 1960, the Donahoe Act, which provided for a tripartite system of higher education comprising the University of California, the state colleges, and the junior colleges
- In 1961, legislation which provided $10 million in tax relief grants for construction and bond redemption to districts maintaining junior colleges
- In 1963, Senate Bill 1515 (Stiern), which provided for the allocation of $20 million in state bond funds for construction to districts maintaining junior colleges
- In 1964, Assembly Bill 145 (Unruh), which raised the junior college foundation program from $570 to $600 per unit of average daily attendance

(Continued on page 32)

NEWS AND NOTES

THEODORE R. SMITH
SECTION EDITOR

From the Meetings of the Board

RACIAL CENSUS—The State Board of Education has requested that the Department of Education devise procedures for obtaining a periodic ethnic census of pupils and certificated personnel in every public school in the state. The Board has also asked that the procedures include a means for reporting school districts' plans which would affect the ethnic balance of pupils and the employment and assignment of minority personnel.

In requesting the Department to draw up plans for the census as soon as possible, the Board pointed out that it has established a policy to exert all possible efforts ". . . to avoid and eliminate segregation of children in public schools on account of race or color. . . ." The information that would be gained by an ethnic census is deemed vital in carrying out this policy, especially if problems of ethnic imbalance are to be solved before they become acute.

COMPENSATORY EDUCATION—The first Board-approved applications for funds under Title I of the Elementary and Secondary Education Act total $24.6 million. The largest of the first allocations, $12.1 million, will go to aid disadvantaged children in Watts and other low income areas of Los Angeles Unified School District.

In all, California is entitled to spend $77.8 million in federal funds during the current school year for various school programs for the disadvantaged.

Among some of the other initial allocations, San Francisco is scheduled to receive $3.46 million; San Diego, $2.6 million; Long Beach, $1.98 million; and Fresno, $1.3 million.

STATE TESTING—By passing Senate Bill 1146 (Sedgwick), the Legislature established that one test, rather than a choice of tests, be used in each area examined in the state testing program. The Board has made the necessary adjustments in the California Administrative Code, Title 5 (Sections 85.1 and 85.5), to comply with this legislative mandate.

DR. FEYNMAN HONORED—Richard P. Feynman, recent winner of the Nobel Prize in physics, served for more than a year on the State Curriculum Commission. During that time, he took a leading role in the selection of mathematics textbooks for California school children.

In recognition of his winning the coveted prize and in serving on the commission, the Board paid tribute to the professor from the California Institute of Technology by adopting a resolution in which he was congratulated "on the greatness of his achievement." The Board's resolution also called "attention of the people of California to the service performed for California children by one who, in the midst of creative work, gave freely of his time to help" in the selection of textbooks that will be used in the public schools for the next several years.

BOARD OF EDUCATION MEETINGS

February 10–11, Room 1194, State Building Annex, 455 Golden Gate Avenue, San Francisco

March 10–11, Room 1138, Junipero Serra Building, 107 South Broadway, Los Angeles

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SCHOOL DISTRICT ORGANIZATION—The Board approved the Department of Education's recommendation for the formation of a unified school district comprising the territory of Bishop Union High School District in Inyo County.

The Board rejected the recommendation of the Santa Clara County Committee on School District Organization for the formation of a high school district comprising the territory of the Montebello School District.

The Board again rejected the recommendation of the San Diego County Committee on School District Organization for the formation of two unified school districts comprising the territory of Grossmont Union High School District and the recommendation of the San Mateo County Committee on School District Organization for the formation of two unified school districts from the territory of Jefferson Union

High School District. In line with procedures established by the Lanterman-Ryan Bill, AB 782, these two proposals will be submitted to the School District Reorganization Reviewing Committee, which will attempt to settle the impasses.

ESEA—The Board has given its approval to seek federal support under Title V of the Elementary and Secondary Education Act for the funding of these three projects:

- A second work shift in the data processing facility in the Department
- Workshops for school business administrators
- A State Committee on Public Education (SCOPE) which would advise the State Board on the current condition and future development of Education in California

BASIC READING ACT—May 17 through 31 of this year has been set as the first testing period under the Miller-Unruh Basic Reading Act of 1965. All pupils enrolled in grades one and two who are considered September entrants must be given the designated reading test sometime during the May 17–31 period. The scores must be reported to the Department of Education on or before July 1.

Beginning in 1967 and each year thereafter, all pupils in the first three grades must be administered the reading test during the first ten school days in January if they are midyear entrants, and during the last ten school days in May if they are September entrants (see sections 430–36 of the California Administrative Code, Title 5).

EDUCATORS HONORED—By special resolutions, the Board has paid tribute to Helen Heffernan, Frank Lindsay, and Ivan R. Waterman, all of whom retired recently from the Department of Education. Each was recognized for his many years of service to the Department and for his leadership in education.

JC ATTENDANCE ACCOUNTING—By revising Section 9 of the California Administrative Code, Title 5, the Board has clarified the method for computing full and partial class hours of attendance in regular junior college classes.

The new plan of attendance accounting, which was worked out in cooperation with an ad hoc committee of junior college representatives, provides a method which may be uniformly applied by the junior colleges. The Board action also clarifies the wording of Section 9 in the code so that the different interpretations and inconsistencies that have been revealed in audits may be eliminated.

SPECIAL EDUCATION—A total of $160,000 in federal funds will be available to California in 1966–67 for training professional personnel in the education of handicapped children. Subject to approval by the U.S. Office of Education, the Board has approved the manner in which the Department proposes to distribute traineeships and fellowships among the several programs stipulated by the federal law. For information about the programs, write to the Division of Special Schools and Services in the Department of Education.

TEXTBOOKS—The current schedule of textbook adoption activities calls for the State Board of Education to adopt books in the following subjects at its May meeting: science, grades one through eight, health, grades one through eight; social sciences, grades one and two; history, geography, civics, and related social sciences, grades five and eight.

DISTRICT ORGANIZATION

(Continued from page 30)

- In 1965, Senate Bill 318 (Stiern), which provided for a continuing program of state support for the construction of junior college facilities and for the allocation of state funds, $50 million presently being available from state bonds authorized by the electorate in November, 1964

Enrollment in junior colleges is growing more rapidly than enrollment in the state colleges or the University of California. During the 1964–65 school year, 277,529 students attended junior colleges. By 1970, it is estimated 350,000 students will be in attendance. The increasing demand for junior college services requires that local governing boards, county committees on school district organization, and the Legislature give careful consideration to the problems each faces in making provisions to meet this demand.

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RETURN REQUESTED

Calendar of Educational Meetings—February and March

February

3-5—California Young Homemakers Association, Annual State Convention; Hyatt House Motel, Salinas

4-5—California Association of Secondary School Administrators, Director of Student Activities Conference; Bakersfield

4-5—California School Food Service Association, Executive Board; International Inn, Los Angeles

4-5—Claremont Reading Conference; Harper Hall, Claremont

4-6—California School Nurses' Organization, Annual Conference; Hotel Senator, Sacramento

5—California Association of School Librarians, Southern Section Meeting; Alhambra High School, Alhambra

5—California School Food Service Association, State Executive Board Meeting

10-11—State Board of Education; Room 1194, State Building Annex, 455 Golden Gate Avenue, San Francisco

11-12—Council for Exceptional Children, California State Federation Board Meeting; International Hotel, Los Angeles Airport

11-13—California Association of Educational Office Employees, Annual Conference; Sacramento Inn, Sacramento

12-15—National Council of Teachers of English, Spring Institute; Santa Barbara

12-16—American Association of School Administrators, Annual Convention; Convention Hall, Atlantic City

18-20—California Band Directors Association, Inc., California State Honor Band Clinic; Pittsburg High School, Pittsburg

20-22—California Counseling and Guidance Association; Hilton Hotel, San Francisco

25-27—California Association of Teachers of English, Annual Convention; Hilton Hotel, San Francisco

26—Compensatory Education Conference; California Junior High School Auditorium, 2991 Land Park Drive, Sacramento

26—Rowland Team Teaching Conference; Rowland School District, 1830 Nogales Street, Rowland Heights

26-28—California Council for the Social Studies, Annual State Conference; Asilomar Conference Grounds, Pacific Grove

March

1—California Education Study Council, Quarterly Meeting; San Francisco

3-6—California Association of School Librarians, State Conference; Jack Tar Hotel, San Francisco

4-5—California Industrial Education Association, Annual Convention; Bakersfield Convention Center

4-5—California Mathematics Council, Central Section Spring Conference; San Luis Obispo

4-6—California Association for Childhood Education, Study Conference; Hilton Hotel, San Francisco

4-6—California Association of Women Deans and Vice-Principals, Northern Section; Palo Alto

5-9—California Parks and Recreation Society, 18th Annual State Conference; Ambassador Hotel, Los Angeles

8-10—California Congress of Parents and Teachers, Inc., Board of Managers' Meeting; Statler-Hilton Hotel, Los Angeles

10-11—State Board of Education; Room 1138, Junipero Serra Building, 107 South Broadway, Los Angeles

10-11—Western College Association, Annual Meeting; Mills College, Oakland

10-12—California Association of Women Deans and Vice-Principals, Southern Region Conference; Biltmore Hotel, Santa Barbara

10-12—Western Speech Association, Annual Convention; Disneyland Hotel, Anaheim

11-12—American Association of University Women, Spring Conference, Northern Area; El Rancho Hotel, Sacramento

12—1966 Good Teaching Conference for Teachers of Mentally Retarded Children; California State College at Long Beach

16-18—California Association of School Psychologists and Psychometrists, Conference; International Hotel, Los Angeles

17—County of Los Angeles Superintendent of Schools, Fifth Annual Career Guidance Center; Great Western Exhibit Center, 2120 South Eastern Avenue, Los Angeles

19—California Mathematics Council, Northern Section, Spring Conference; Foothill College, Los Altos

24—1966 California Speech and Hearing Association Annual Conference; El Cortez Hotel, San Diego

24-26—1966 Annual Meeting of California Transcribers and Educators of the Visually Handicapped, Sainte Clare Hotel, San Jose

24-26—California Speech and Hearing Association, Annual Conference; El Cortez Hotel, San Diego

25-27—American Association on Mental Deficiency, Region 3, Annual Conference; Palo Alto

26—California Library Association, Black Gold District Meeting; Ventura

27-28—California Council for Adult Education, Statewide Spring Conference; International Hotel, Los Angeles

27-30—California Association of County Superintendents of Schools, Spring Conference; Asilomar Conference Grounds, Pacific Grove *

29-Apr. 2—California Association of Public School Business Officials, Annual Conference; Jack Tar Hotel, San Francisco *

31-Apr. 2—California Council on the Education of Teachers, Spring Conference; Miramar Hotel, Santa Barbara

* *Meetings called by the Superintendent of Public Instruction*